<table>
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<tr>
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<th>Search strategies and information resources</th>
</tr>
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<tbody>
<tr>
<td>Author(s)</td>
<td>Sommerville, Joseph</td>
</tr>
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Electronic Mail

An electronic mail message is not limited to text. Other types of files can be added to mail messages as attachments. Attachments can be binary files such as a word processed document, a spreadsheet or a graphic image.

A standard called MIME, Multipurpose Internet Mail Extensions, allows for non-text files to be encoded on the sending computer and decoded on the receiving computer.
Electronic Mail

An e-mail address is read from left to right.

tjoseph@ntu.edu.sg

- "tjoseph" is the name of the person sending or receiving the message; this is referred to as the username.
- "ntu" is part of the domain name of the organization
- "edu" is also part of the domain name and indicates that widgets is a commercial organization.
- "sg" identifies the country

Electronic Mail

Simple Mail Transfer Protocol—SMTP is part of the TCP/IP suite of protocols.

SMTP is a protocol, or set of rules that enables electronic mail to move smoothly through the Internet. Because of SMTP, a UNIX machine can send mail to a PC or Macintosh computer and vice versa.

Electronic Mail

- Electronic mail works on the client/server principle. A client program enables the user to interact with a server in order to access information and services on the server computer.
- To read and send mail, users need to access the computer where their mail resides (the server).
- The client application is the interface which lets a user read, reply to, forward, compose and send new messages.
Practicum

- Point Browsers to:
  http://www.ntu.edu.sg/home/tjoseph/email.html

Electronic Mail

An e-mail address identifies a person and the computer for purposes of exchanging electronic mail messages. The basic structure of an e-mail address is:

username@host.subdomain.second-level-domain.first-level-domain

- tjoseph@ntu.edu.sg
Electronic Mail

Electronic mail, or e-mail, allows information to be sent between computers and people on the Internet. It is the most widely used Internet resource. An electronic mail message can be sent to one or more e-mail addresses.

Electronic Mail

- Proprietary Service (jsommerville@aol.com)
- ISP-Based (tjoseph@singnet.com.sg)
- Organisation-Based (tjoseph@ntu.edu.sg)
- Host-Based (Joseph@Sommerville.Net)
- Web-Based (tjoseph@hotmail.com)

Web-Based Email

- Advantages
  - Collect mail from any browser in the world
- Disadvantages
  - Advertising
  - Compose online
URL

ftp://ftp.company.com/freeware/program.exe tells us that:

• the protocol used to access and transmit the resource is FTP;
• the resource is on the machine "ftp" in the second-level domain "company", which is part of "com," or the top level domain for commercial organizations;
• the resource is in the directory labeled "freeware" and is a software program called "program.exe".

Not all URLs will have the directory and filename.

URL

In addition, URLs can be case sensitive. The use of upper and lower case letters can be important. Thus the following URLs may point to two different resources:

http://www.example.edu/library/catalog/guide.txt
http://www.example.edu/library/catalog/GUIDE.txt

Electronic Mail

• Exchanging information via computer networks
• Electronic mail addresses
• SMTP (Simple Mail Transfer Protocol)
• Client/Server based
• Text, graphics, or data files
URL

- A way to identify resources available via the World Wide Web
- Addressing scheme
- Hierarchical
- Protocols, computers, and file names

URL

URL stands for Uniform Resource Locator. A URL identifies a particular Internet resource, for example a Web page, a gopher server, a library catalog, an image, or a text file.

URLs represent a standardized addressing scheme for Internet resources, and help users locate these resources by indicating exactly where they are.

Every resource available via the World Wide Web has a unique URL.

URL

URLs consist of letters, numbers, and punctuation.

The basic structure of a URL is hierarchical, and the hierarchy moves from left to right:

- protocol
- server name
- domain name
- top-level domain
- port
- directory
- filename

Examples:

http://www.ecanet.net

gopher://gopher.state.edu/

Web Page

A web page is transferred to a user's computer via the hypertext transfer protocol (HTTP).

HTTP is the method through which hypertext files, such as web pages, are transferred over the Internet. HTTP is a client/server based Internet protocol, or set of rules.

Web page generally reside on HTTP servers. A user requests a web page from an HTTP (web) server through his or her web browser client software, either by clicking on a hypertext link or designating a particular URL (Uniform Resource Locator). The server then sends the requested information to the user's computer.

The browser software interprets the HTML codes and presents the information contained in the web page in a readable format on the user's computer.
A web page is a single unit of information, often called a document, that is available via the World Wide Web (WWW). A web page can be longer than one computer screen and can use more than one piece of paper when it is printed out.

A web page is created using Hypertext Markup Language (HTML). HTML consists of standardized codes, or tags, that are used to define the structure of a web page. These codes enable web pages to have many features including bold text, italic text, headings, paragraph breaks and numbered or bulleted lists.

Web pages can contain text, images, sound files, video files and hypertext links to other Internet resources. All of these features are indicated by using HTML codes.

The following web page was created with the HTML coding shown. On the left is the HTML file that was written to create the web page. The HTML file is a plain text file that has been saved with an "html" file extension. HTML files can be written in any text editing program.
World Wide Web

Because the Web is not hierarchical and can handle graphics, it offers a great deal of flexibility in the way information resources can be organized, presented, and described.

World Wide Web—Common File Types

- Html—hypertext markup language (webpage)
- Pdf—portable document format (page layout)
- Gif—Graphics interchange format (image)
- Jpeg—Joint photographics expert group (image)
- Mpeg—Motion pictures expert group (video)

Web Page

- Unit of information
- HTML (Hypertext Markup Language)
- Text file
- HTTP (Hypertext Transfer Protocol)
World Wide Web

Hypertext "links" can lead to other documents, sounds, images, databases (like library catalogs), e-mail addresses, etc. This sample web page is from the Smithsonian.

World Wide Web

Because it can incorporate graphics and "understands" other Internet protocols, the web can provide an easy-to-use interface for resources available via these protocols.

World Wide Web

The World Wide Web is non-linear. There is no top, there is no bottom. Non-linear means you do not have to follow a hierarchical path to information resources.

- You can jump from one link (resource) to another:

- You can go directly to a resource if you know the Uniform Resource Locator (URL) (its address):
World Wide Web

- A way to provide and access information resources on the Internet
- Based on hypertext and HTTP (Hypertext Transfer Protocol)
- Non-linear
- Multimedia
- Flexible

The World Wide Web, also referred to as the WWW and "the Web," is the universe of information available via hypertext transfer protocol (HTTP).

The World Wide Web and HTTP:
- allow you to create "links" from one piece of information to another;
- can incorporate references to sounds, graphics, and movies, etc.;
- "understand" other Internet protocols, such as ftp, gopher, and telnet.

World Wide Web

- The Web presents information as a series of "documents," often referred to as web pages, that are prepared using the Hypertext Markup Language (HTML).
- Using HTML, the document's author can specially code sections of the document to "point" to other information resources. These specially coded sections are referred to as hypertext links.
- Users viewing the webpage can select the hypertext link and retrieve or connect to the information resource that the link points to.
1990's

1990 - The ARPANET is dissolved.

1991 - Gopher is developed at the University of Minnesota. Gopher provides a hierarchical, menu-based method for providing and locating information on the Internet. This tool makes using the Internet much easier.

1993 - The European Laboratory for Particle Physics in Switzerland (CERN) releases the World Wide Web (WWW), developed by Tim Berners-Lee. The WWW uses hypertext transfer protocol (HTTP) and hypertext links, changing the way information can be organized, presented and accessed on the Internet.

1993 - The NSFNET backbone network is upgraded to T3, which means that it is able to transmit data at speeds of 45 million bits of data per second, or about 1400 pages of text per second.

1993-1994 - Mosaic and Netscape browsers introduced

1995 - NSFNET backbone replaced by a new network architecture, called vBNS (very high speed backbone network system) that utilizes Network Service Providers, regional networks and Network Access Points (NAPs).
1980's
Several significant events occurred in 1983, including:

- The TCP/IP suite of networking protocols, or rules, becomes the only set of protocols used on the ARPANET. This decision sets a standard for other networks, and generates the use of the term "Internet" as the network of networks which either use the TCP/IP protocols or are able to interact with TCP/IP networks.

- To keep military and non-military network sites separate, the ARPANET splits into two networks: ARPANET and MILNET.

1980's
In 1982 and 1983, the first desktop computers began to appear. Many are equipped with an operating system called Berkeley UNIX, which includes networking software. This allows for relatively easy connection to the Internet using telnet.

Personal computers growth continues through the eighties, making access to computer resources and networked information increasingly available to the general public.

1985-86: The National Science Foundation (NSF) connects the nation's six supercomputing centers together. This network is called the NSFNET, or NSFNET backbone.

To expand access to the Internet, the NSF supported the development of regional networks, which were then connected to the NSFNET backbone. In addition, the NSF supported institutions, such as universities, in their efforts to connect to the regional networks.
History of the Internet

- ARPANET (Advanced Research Projects Agency Network)
- TCP/IP (Transmission Control Protocol/Internet Protocol)
- NSFNET (National Science Foundation Network)
- Desktop computers
- Network upgrades
- Internet tools

1960's

1969 - The Department of Defense Advanced Research Projects Agency creates an experimental network called ARPANET.

ARPANET originally connected four universities and enabled scientists to share information and resources across long distances. ARPANET continued to expand, connecting many more sites throughout the 1970's and 1980's.

1970's

Networking tools are developed in the 1970's including:

- 1972 - The National Center for Supercomputing Applications (NCSA) develops the telnet application for remote login, making it easier to connect to a remote computer.
- 1973 - FTP (file transfer protocol) is introduced, standardizing the transfer of files between networked computers.
History of the Internet

1980's

• 1987 - The NSF awards a grant to Merit Network, Inc. to operate and manage future development of the NSFNET backbone. Merit Network, Inc. collaborates with IBM Corporation and MCI Telecommunications Corporation to research and develop faster networking technologies.

• 1989 - The backbone network is upgraded to "T1" which means that is able to transmit data at speeds of 1.5 million bits of data per second, or about 50 pages of text per second.

Network Transmission Speeds

- 28.8 Modem 28,800 bps
- ISDN 64,000 bps
- T1 Line 1,500,000 bps
- Ethernet 10,000,000 bps
- T-3 Line 45,000,000 bps
- ATM (fiber optic) 660,000,000
THE WORKSHOP ON MANAGEMENT OF ENVIRONMENTAL INFORMATION RESOURCES FOR JOURNALISTS, SINGAPORE, 9-14 NOVEMBER, 1998

APPENDIX FOUR

EVALUATION SUMMARY

AT

AMIC

SINGAPORE